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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,399	10/09/2003	Joon Chang	AUS920030298US1	8359

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EXAMINER
TRUONG, LOAN

ART UNIT	PAPER NUMBER
2114	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/682,399	CHANG ET AL.
	Examiner	Art Unit	
	LOAN TRUONG	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 October 2003</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9, 11-20 and 22-23* is/are rejected.

7)☒ Claim(s) *10 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>09 October 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1.   Claims 10 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Specification

2.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of **50 to 150 words**. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuta et al.

(US 6,243,824) in further view of Yang et al. (US 2004/0059855).

In regard to claim 1, Kakuta et al. disclosed a method of handling Write input/output

(I/O) requests during a backup operation on at least one storage device, comprising:

receiving a Write I/O request for performing a Write I/O operation to a logical volume,

wherein at least a portion of the logical volume resides on the at least one storage device (*write*

operation received by a group of data disks, fig. 2, 6a, 6b, col. 4 lines 35-67 and col. 5 lines 1-

10);

determining if a backup operation is being performed on the at least one storage device

(*backup-in-process flag is ON, fig. 13, 134)*; and

suspending the Write I/O operation in a logical volume manager until after the backup

operation is completed if it is determined that the backup operation is being performed (*write*

data item is saved in storing disk 9 and transfer to DCU (data control unit) after backup

operation, fig. 4, col. 8 lines 23-31 and lines 46-49), wherein Write I/O operations to at least one

other logical volume are not suspended during the backup operation (*write request issued to data*

disk 6a only subdata item for disk 6a is written on the write data storing disk 9, fig. 7, 77a, 78b,

col. 10 lines 15-20).

Kakuta et al. does not teach the method of logging the Write I/O request in a file

system log indicating that the Write I/O request is being submitted to the at least one

storage device.

Yang et al. disclosed the method of the interrupt handler receiving the write

request and register the write request on the queue (*paragraph 0029)*.

It would have been obvious to modify the method of Kakuta et al. by adding Yand

et al. method of handling write requests. A person of ordinary skill in the art at the time

of applicant's invention would have been motivated to make the modification because it

would not disrupt the integrity of shared resources (*paragraph 0011)*.

In regard to claim 2, Kakuta et al. disclosed the method of claim 1, wherein suspending

the Write I/O operation includes:

storing the Write I/O request in a hold queue in the logical volume manager, wherein the

Write I/O request is not forwarded to the at least one storage device while the Write I/O request

is in the hold queue (*write data item is saved in storing disk 9 and transfer to DCU (data control*

unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49).

In regard to claim 3, Kakuta et al. disclosed the method of claim 1, wherein determining if a backup operation is being performed includes:

determining if a backup flag is set in a logical volume manager (*backup-in-process flag is ON, fig. 13, 134*).

In regard to claim 4, Kakuta et al. disclosed the method of claim 3, wherein the backup flag is set in response to receipt of a message from a backup application indicating that a backup operation has been initiated (*after backup initiate command is issued for a group of disks, the backup processor sets a backup-in-process flag to ON for the group, fig.12, 124, 125, col. 6 lines 15-18*).

In regard to claim 5, Kakuta et al. disclosed the method of claim 1, wherein the backup operation is a point-in-time backup operation (*backup operation is initiated by a predetermine value of the I/O counter or a previous backup time, col. 5 lines 52-57*).

In regard to claim 6, Kakuta et al. disclosed the method of claim 2, further comprising:

receiving a message indicating that the backup operation is complete (*when backup operation is achieved backup processor sets the backup-in-process flag to OFF, fig. 12, 130, col. 6 lines 37-40*); and

releasing the Write I/O request from the hold queue in response to receiving the message (*after backup operation is complete write data item is transferred to the DCU (data control unit), col. 8 lines 46-49*); and

submitting the Write I/O request to the at least one storage device (*write request is issued to data disk 6a, fig. 5, 77a, 6a, col. 10 lines 15-20*).

In regard to claim 7, Kakuta et al. does not teach the method of claim 2, wherein the hold queue is a linked list in which Write I/O requests are stored in an order in which they are received by the logical volume manager.

Yang et al disclosed the method of storing the write request queue in a fixed size and place in the order starting from the first end in which they were received from the interrupt handler (*paragraph 0049 and paragraph 0051*).

Refer to claim 1 for motivational statement.

In regard to claim 8, Kakuta et al. does not teach the method of claim 6, wherein Write I/O requests in the hold queue are released from the hold queue in an order in which they were received by the logical volume manager.

Yang et al. disclosed the method of servicing the write request by a FIFO servicing schedule (*paragraph 0056*).

Refer to claim 1 for motivational statement.

In regard to claim 9, Kakuta et al. disclosed the method of claim 6, further comprising:

updating file system metadata based on the file system log only after the backup operation is complete and the Write I/O operation is released from the hold queue (*after backup operation is complete write data item is transferred to the DCU (data control unit), col. 8 lines*

46-50).

In regard to claim 11, Kakuta et al. disclosed the method of claim 1, wherein the Write

I/O request is suspended only if the Write I/O request is to a block of data that is subject to the

backup operation (*backup processor sets a backup-in-process flag to ON for the group that*

under backup operation, fig. 12, 126, col. 6 lines 15-18, if flag is OFF command interpreting

unit carries out ordinary read/write processing, fig. 13, 135).

In regard to claim 12, Kakuta et al. disclosed a computer program product in a computer

readable medium for handling Write input/output (I/O) requests during a backup operation on at

least one storage device, comprising:

first instructions for receiving a Write I/O request for performing a Write I/O operation to

a logical volume, wherein at least a portion of the logical volume resides on the at least one

storage device (*write operation received by a group of data disks, fig. 2, 6a, 6b, col. 4 lines 35-*

67 and col. 5 lines 1-10);

third instructions for determining if a backup operation is being performed on the at least

one storage device (*backup-in-process flag is ON, fig. 13, 134)*; and

fourth instructions for suspending the Write I/O operation in a logical volume manager

until after the backup operation is completed if it is determined that the backup operation is being

performed (*write data item is saved in storing disk 9 and transfer to DCU (data control unit)*

after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49), wherein Write I/O operations

to at least one other logical volume are not suspended during the backup operation (*write request*

issued to data disk 6a only subdata item for disk 6a is written on the write data storing disk 9,

fig. 7, 77a, 78b, col. 10 lines 15-20).

Kakuta et al. does not teach the program product second instruction of logging the

Write I/O request in a file system log indicating that the Write I/O request is being

submitted to the at least one storage device.

Yang et al. disclosed the instruction of the interrupt handler receiving the write

request and register the write request on the queue *(paragraph 0029).*

Refer to claim 1 for motivational statement.

In regard to claim 13, Kakuta et al. disclosed the computer program product of claim 12,

wherein the third instructions for suspending the Write I/O operation include:

instructions for storing the Write I/O request in a hold queue in the logical volume

manager, wherein the Write I/O request is not forwarded to the at least one storage device while

the Write I/O request is in the hold queue *(write data item is saved in storing disk 9 and transfer*

to DCU (data control unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49).

In regard to claim 14, Kakuta et al. disclosed the computer program product of claim 12,

wherein the second instructions for determining if a backup operation is being performed

include:

instructions for determining if a backup flag is set in a logical volume manager *(backup-*

in-process flag is ON, fig. 13, 134).

In regard to claim 15, Kakuta et al. disclosed the computer program product of claim 14, wherein the backup flag is set in response to receipt of a message from a backup application indicating that a backup operation has been initiated (*after backup initiate command is issued for a group of disks, the backup processor sets a backup-in-process flag to ON for the group, fig. 12, 124, 125, col. 6 lines 15-18*).

In regard to claim 16, Kakuta et al. disclosed the computer program product of claim 12, wherein the backup operation is a point-in-time backup operation (*backup operation is initiated by a predetermine value of the I/O counter or a previous backup time, col. 5 lines 52-57*).

In regard to claim 17, Kakuta et al. disclosed the computer program product of claim 13, further comprising:

fourth instructions for receiving a message indicating that the backup operation is complete (*when backup operation is achieved backup processor sets the backup-in-process flag to OFF, fig. 12, 130, col. 6 lines 37-40*); and

. fifth instructions for releasing the Write I/O request from the hold queue in response to receiving the message (*after backup operation is complete write data item is transferred to the DCU (data control unit), col. 8 lines 46-49*); and

sixth instructions for submitting the Write I/O request to the at least one storage device (*write request is issued to data disk 6a, fig. 5, 77a, 6a, col. 10 lines 15-20*).

In regard to claim 18, Kakuta et al. does not teach the computer program product of claim 13, wherein the hold queue is a linked list in which Write I/O requests are stored in an order in which they are received by the logical volume manager.

Yang et al disclosed the method of storing the write request queue in a fixed size and place in the order starting from the first end in which they were received from the interrupt handler (*paragraph 0051*).

Refer to claim 1 for motivational statement.

In regard to claim 19, Kakuta et al. does not teach the computer program product of claim 17, wherein Write I/O requests in the hold queue are released from the hold queue in an order in which they were received by the logical volume manager.

Yang et al. disclosed the method of servicing the write request by a FIFO servicing schedule (*paragraph 0056*).

Refer to claim 1 for motivational statement

In regard to claim 20, Kakuta et al. disclosed the computer program product of claim 17, further comprising:

seventh instructions for updating file system metadata based on the file system log only after the backup operation is complete and the Write I/O operation is released from the hold queue (*write data item is saved in storing disk 9 and transfer to DCU (data control unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49*).

In regard to claim 22, Kakuta et al. disclosed the computer program product of claim 12, wherein the Write I/O request is suspended only if the Write I/O request is to a block of data that is subject to the backup operation (*backup processor sets a backup-in-process flag to ON for the group that under backup operation, fig. 12, 126, col. 6 lines 15-18, if flag is OFF command interpreting unit carries out ordinary read/write processing, fig. 13, 135*).

In regard to claim 23, Kakuta et al. disclosed an apparatus for handling Write input/output (I/O) requests during a backup operation on at least one storage device, comprising:

means for receiving a Write I/O request for performing a Write I/O operation to a logical volume, wherein at least a portion of the logical volume resides on the at least one storage device (*write operation received by a group of data disks, fig. 2, 6a, 6b, col. 4 lines 35-67 and col. 5 lines 1-10*);

means for determining if a backup operation is being performed (*backup-in-process flag is ON, fig. 13, 134*); and

means for suspending the Write I/O operation in a logical volume manager until after the backup operation is completed if it is determined that the backup operation is being performed (*write data item is saved in storing disk 9 and transfer to DCU (data control unit) after backup operation, fig. 4, col. 8 lines 23-31 and lines 46-49*), wherein Write I/O operations to at least one other logical volume are not suspended during the backup operation (*write request issued to data disk 6a only subdata item for disk 6a is written on the write data storing disk 9, fig. 7, 77a, 78b, col. 10 lines 15-20*).

Kakuta et al. does not teach the means for logging the Write I/O request in a file system log indicating that the Write I/O request is being submitted to the at least one storage device.

Yang et al. disclosed the instruction of the interrupt handler receiving the write request and register the write request on the queue *(paragraph 0029)*.

Refer to claim 1 for motivational statement.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Loan Truong whose telephone number is (571) 272-2572. The examiner can normally be reached on M-F from 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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